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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/017,444	12/14/2001	Timothy A. Thomas	CR00296M	6296
22917	7590	06/09/2006	EXAMINER	
MOTOROLA, INC. 1303 EAST ALGONQUIN ROAD IL01/3RD SCHAUMBURG, IL 60196			WILLIAMS, LAWRENCE B	
			ART UNIT	PAPER NUMBER
			2611	

DATE MAILED: 06/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/017,444

Applicant(s)

THOMAS ET AL.

Examiner

Lawrence B. Williams

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 13 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 5, 10, 15, 16, 18, 20, 21, 26 and 31-39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 5, 10, 15, 16, 20, 21 and 26 is/are allowed.
- 6) ☒ Claim(s) 31-39 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Objections***

1. Claim 31 is objected to because of the following informalities: The examiner suggest applicant replace the word "vectors" with "vector" in line 6.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

3. Claim 33-34 are rejected under 35 U.S.C. 112, second paragraph, as being vague and indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The examiner is unable to comprehend the meaning of the claim language as present "statistical nature of the channel vector comprises... The examiner suggest applicant rewrite the claim to clarify what is meant by the limitation of claim 33.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 31-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kasapi (US 2003/0064690 A1) in view of Voyer (US Patent 6,952,459 B2).

(1) With regard to claim 31, Kasapi discloses a method of transmitting a plurality of data streams from a transmitter via multiple transmit antennas to a receiving unit, the method comprising the steps of: weighting data streams by equal power weightings to create a plurality of weighted data streams, wherein the unequal power weightings for each data stream is based on a statistical nature of a channel vector and transmitting the plurality of weighted data streams to a receiving unit (pg. 3, paragraph 0023). Kasapi does not explicitly disclose the weightings being based on a noise power.

However, Voyer teaches a method of obtaining a transmission gain function wherein he teaches determining a transmit weighting vector based on a noise power (col. 2, lines 44-67).

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Voyer as a method of obtaining optimum weighting vectors.

(2) With regard to claim 32, Kasapi also discloses wherein the step of transmitting the plurality of weighted data streams includes transmitting the multiple data streams over multiple subcarriers (pg. 1-2, paragraph 0015).

(3) With regard to claim 33, Voyer discloses the statistical nature of the channel vector averaged on a realization of a channel vector wherein the elements of the channel vector are random variable (col. 3, lines 3-20; col. 7, lines 55-67).

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Voyer as a method of obtaining optimum weighting vectors.

(4) With regard to claim 34, Voyer also discloses wherein the random variables are independent complex Gaussian random variables (col. 7, lines 55-67).

(5) With regard to claim 35, Voyer also discloses the method of claim 31, further comprising the steps of being provided the noise power; and determining the unequal power weighting for each data stream (abstract, col. 11, lines 31-35).

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Voyer as a method of obtaining optimum weighting vectors.

6. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kasapi (US 2003/0064690 A1) in view of Voyer (US Patent 6,952,459 B2) as applied to claim 35 above and further in view of Walton et al. (US Patent 6,785,341 B2).

As noted above, Kasapi in combination with Voyer disclose all limitations of claim 35 above. They do not explicitly teach wherein the step of determining the unequal power weighting for each data stream involves determining unequal power weightings so that a stream decoding order of successive cancellation performed at the receiving unit is predetermined.

However, Walton et al. discloses a method of successive cancellation wherein he teaches an order of decoding dependent upon a SNR of received signals. The unequal power weights would create unequal SNRs.

It would have been obvious to one skilled in the art to incorporate the teachings of Walton et al. as a method of improving decoding in a successive cancellation receiver.

7. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kasapi (US 2003/0064690 A1) in view of Voyer (US Patent 6,952,459 B2) as applied to claim 35 above and further in view of Takatori et al. (US 2002/0111191 A1).

As noted above, Kasapi in combination with Voyer disclose all limitations of claim 35 above. They do not explicitly teach wherein the step of determining the unequal power weighting for each data stream involves determining unequal power weightings so that a mean squared error of each data stream after successive cancellation at the receiving unit is substantially equal.

However, Takatori et al. discloses a transmission/reception control method wherein he teaches determining unequal power weighting for each data stream involves determining unequal power weightings so that a mean squared error of each data stream after successive cancellation at the receiving unit is substantially equal (abstract, pg. 8, paragraph 0162).

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Takatori et al. as a method improving frequency efficiency in a radio communication system (pg. 2, paragraph 0027).

8. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kasapi (US 2003/0064690 A1) in view of Voyer (US Patent 6,952,459 B2) as applied to claim 35 above and further in view of Gimlin et al. (US Patent 5,093,842).

As noted above, Kasapi in combination with Voyer disclose all limitations of claim 35 above. They do not explicitly teach wherein being provided the noise power involves the receiving unit feeding back the noise power.

However, Gimlin et al. teaches wherein being provided the noise power involves the receiving unit feeding back the noise power (abstract).

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Gimlin et al. as a method of controlling one or more characteristics of the transmitted signal (col. 4, lines 25-29).

9. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kasapi (US 2003/0064690 A1) in view of Voyer (US Patent 6,952,459 B2) as applied to claim 35 above and further in view of Lee et al. (US 2002/0006168 A1).

As noted above, Kasapi in combination with Voyer disclose all limitations of claim 35 above. They do not explicitly teach wherein the step of determining the unequal power weighting is performed at the receiving unit and the receiving unit provides the unequal power weights to the transmitter.

However, Lee et al. discloses in Fig(s). 1, 5, a step of determining unequal power weighting is performed at receiving unit and the receiving unit provides the unequal power weights to the transmitter (abstract; pg. 1, paragraph 0006).

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Lee et al. as a known method of increasing transmitted data accuracy in the system.

### *Conclusion*

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a.) Izumi discloses in EP 1276251 A1 Method For Calculating A Weighting Vector For

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An Antenna Array.

b.) Parish et al. discloses in US Patent 6,037,898 Method And Apparatus Calibrating Radio Frequency Base Station Using Antenna Arrays.

c.) Hottinen et al. discloses in US 2002/0105961 A1 Transmit Diversity Method and System.

d.) Walton et al. discloses in US Patent 6,662,024 B2 Method And Apparatus For Allocating Downlink Resources In A Multiple-Input Multiple-Output (MIMO) Communication System.

e.) Raleigh et al. discloses in US Patent 6,665,545 B1 Method And Apparatus For Adaptive Transmission Beam Forming In A Wireless Communication System.

f.) Rashid-Farrokhi discloses in US 2002/0027985 A1 Parallel Processing For Multiple Input, Multiple-Output, DSL Systems.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lawrence B Williams whose telephone number is 571-272-3037. The examiner can normally be reached on Monday-Friday (8:00-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ghayour Mohammad can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lawrence B. Williams

lbw

May 27, 2006

  
EMMANUEL BAYARD  
SENIOR EXAMINER